

STRESS OFFSET DISH FOR 1296 EME

By AI - K2UYH



OUTLINE

- **HOW STARTED**
- **WHY A STRESS DISH**
- **WHY A OFFSET DISH**
- **CONSTRUCTION**
- **MOUNTING**
- **PERFORMANCE**

BECAME INTERESTED IN EME IN HIGH SCHOOL

- **EVERYONE SEEMED TO BE USING DISH FOR EME**
- **NEEDED 60' DISH FOR 2 M EME!**
- **DECIDED 60' WAS TOO BIG!**
- **MOVED TO 70 CM AND 30' DISH**



**FIRST EME ANTENNA WAS 30'
STRESS DISH IN 1960!**

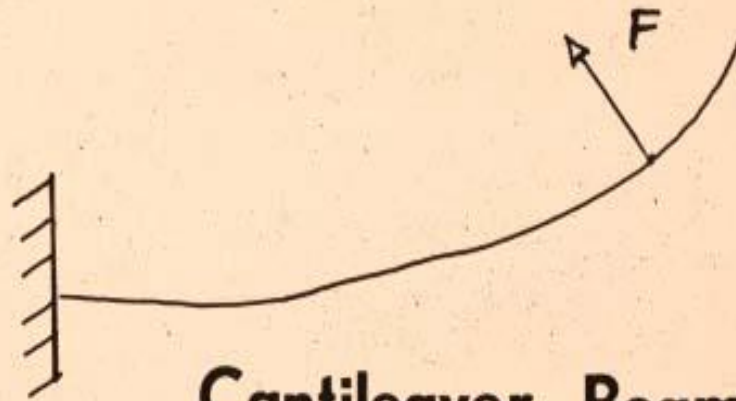
STRESS DISHES

- **EASY TO CONSTRUCT**
- **IDEAL FOR PORTABLE USE**
 - **EASY TO ASSEMBLE/TAKE APART**
- **LIGHT WEIGHT**
- **LOW COST**
- **HIGH GAIN**

**MADE FIRST EME
QSO ON 432 IN 1971
WITH 20' STRESS DISH**



STRESS PRINCIPLE



Cantileaver Beam

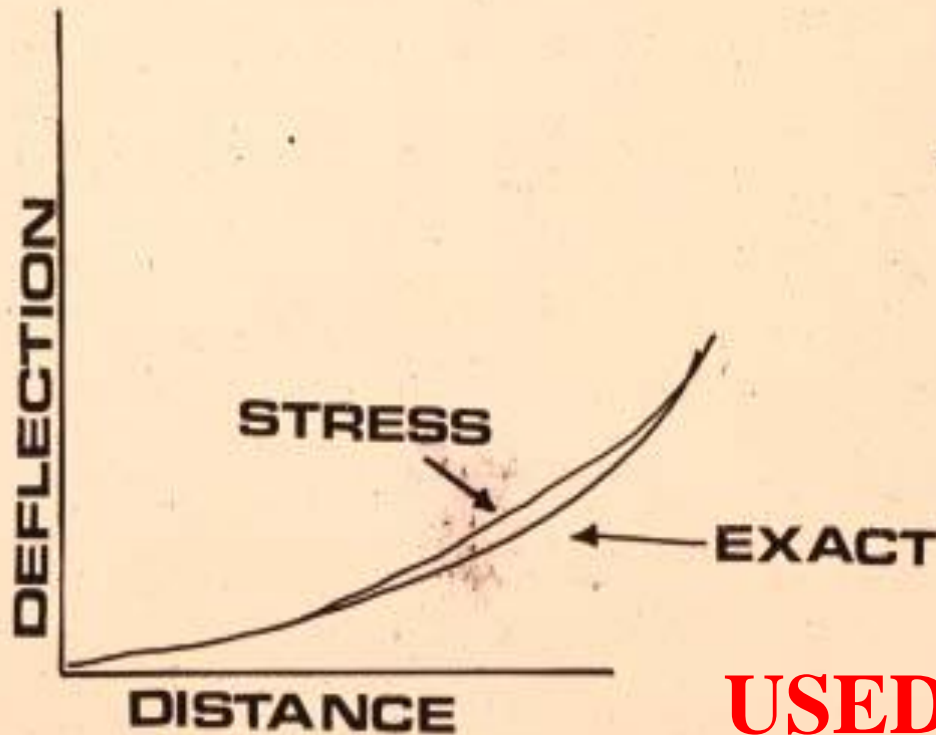
→ **Approximate Parabolic Curve**

DEFLECTION OF TYPICAL SPOKE

ERROR DEPENDS

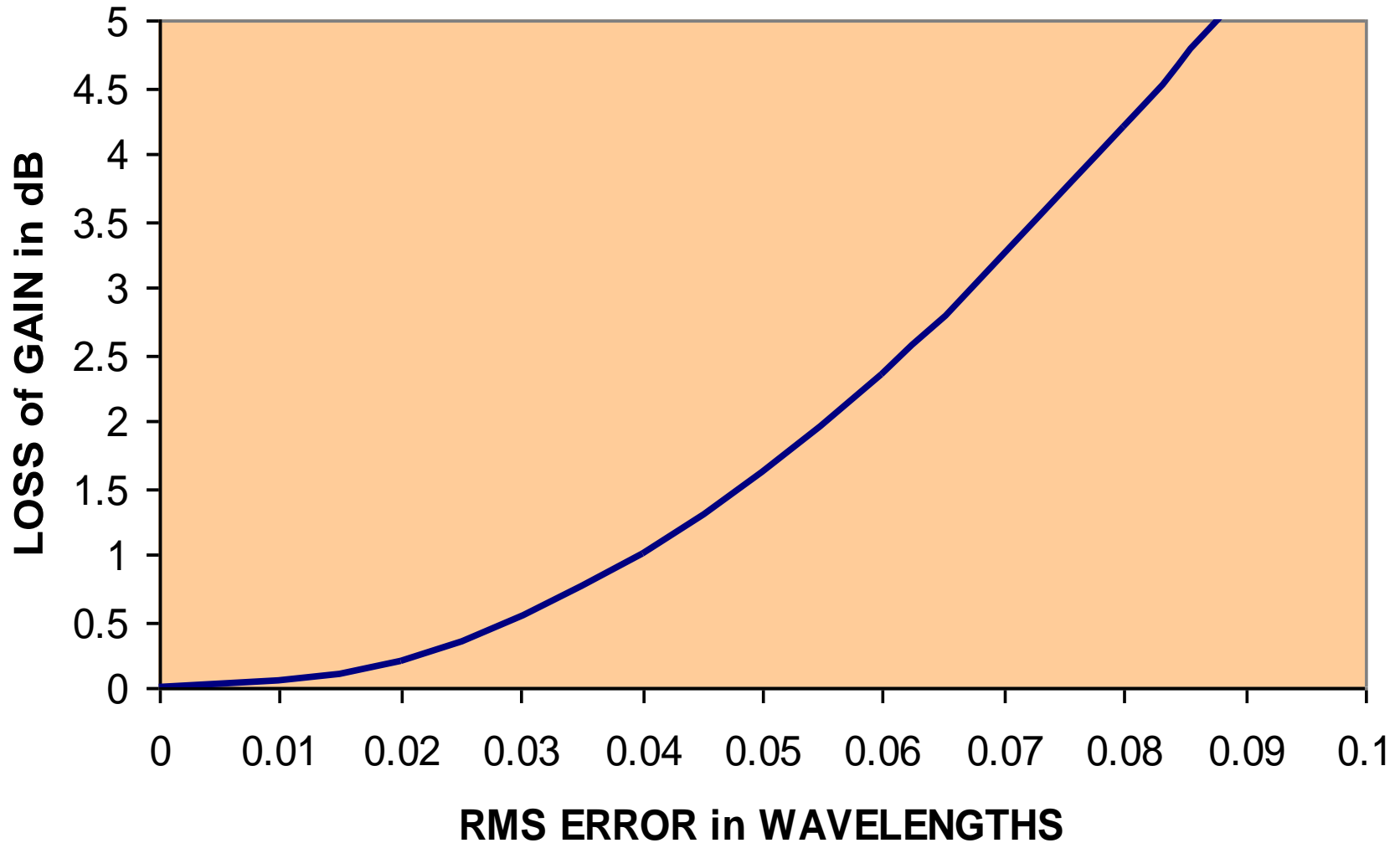
* F/D RATIO

* LENGTH



USED TO > 6 CM

GAIN LOSS DUE TO RMS SURFACE ERROR



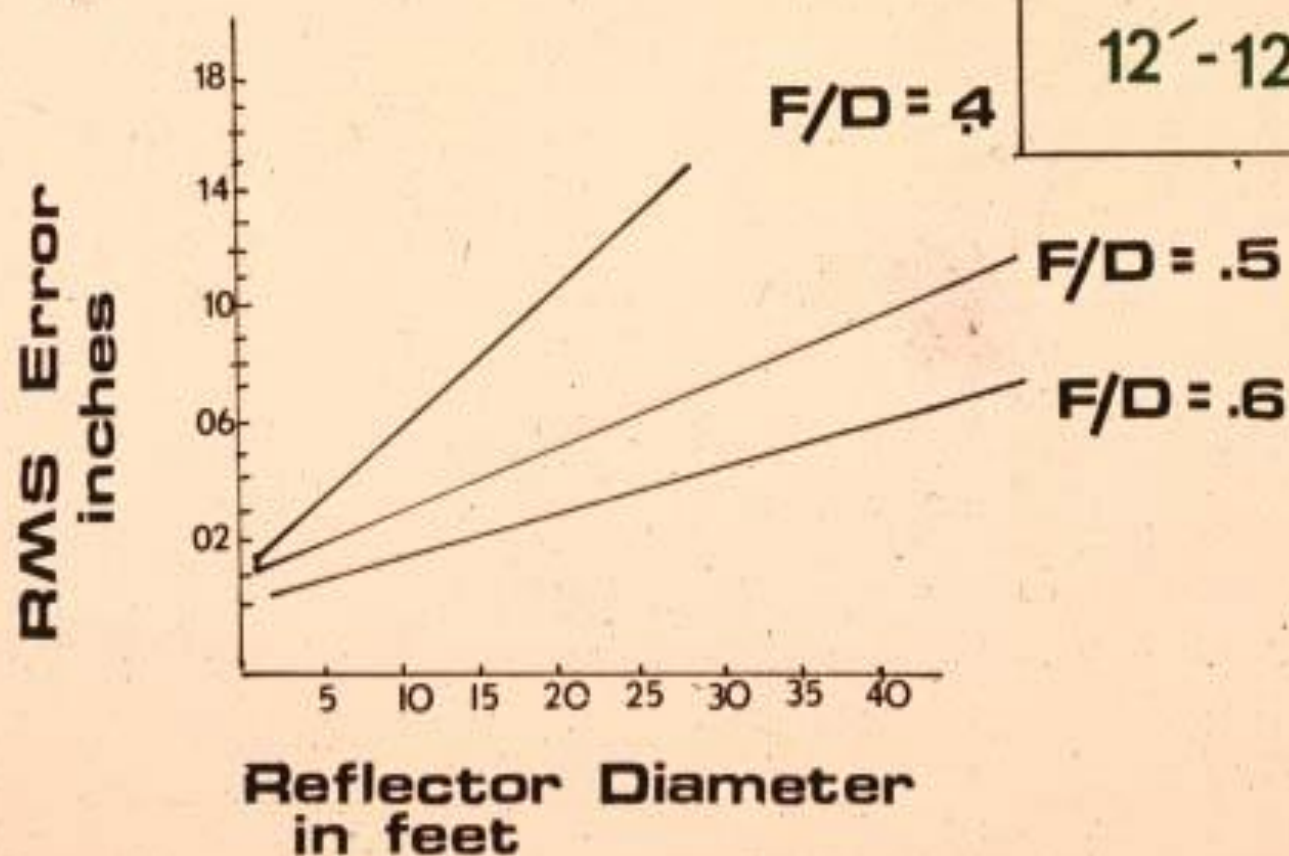
VARIATION OF RMS ERROR WITH LENGTH -LINEAR

FOR 12' DISH @ 1296

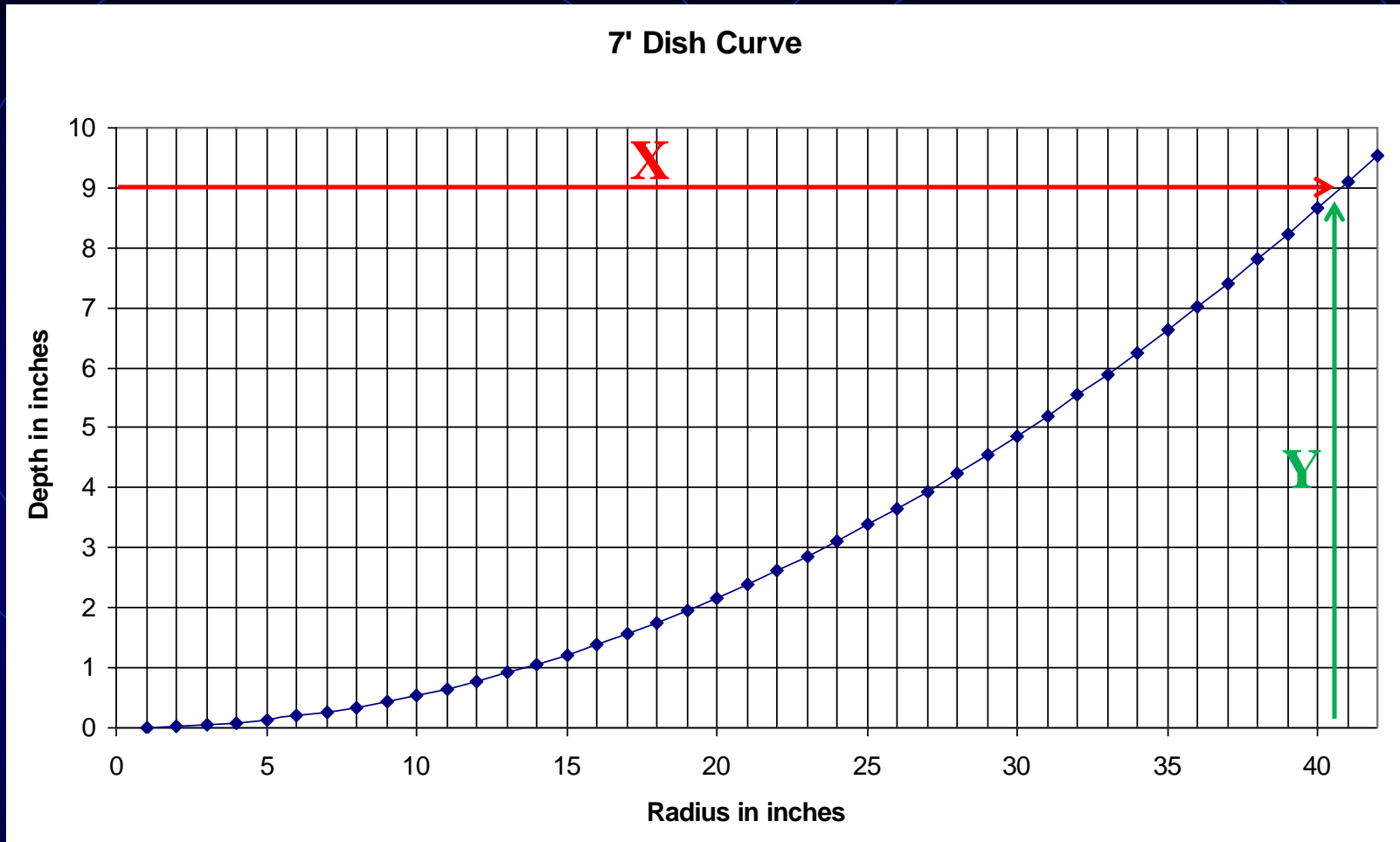
GAIN LOSS < 1db

40'-432 MHz

12'-1296 MHz

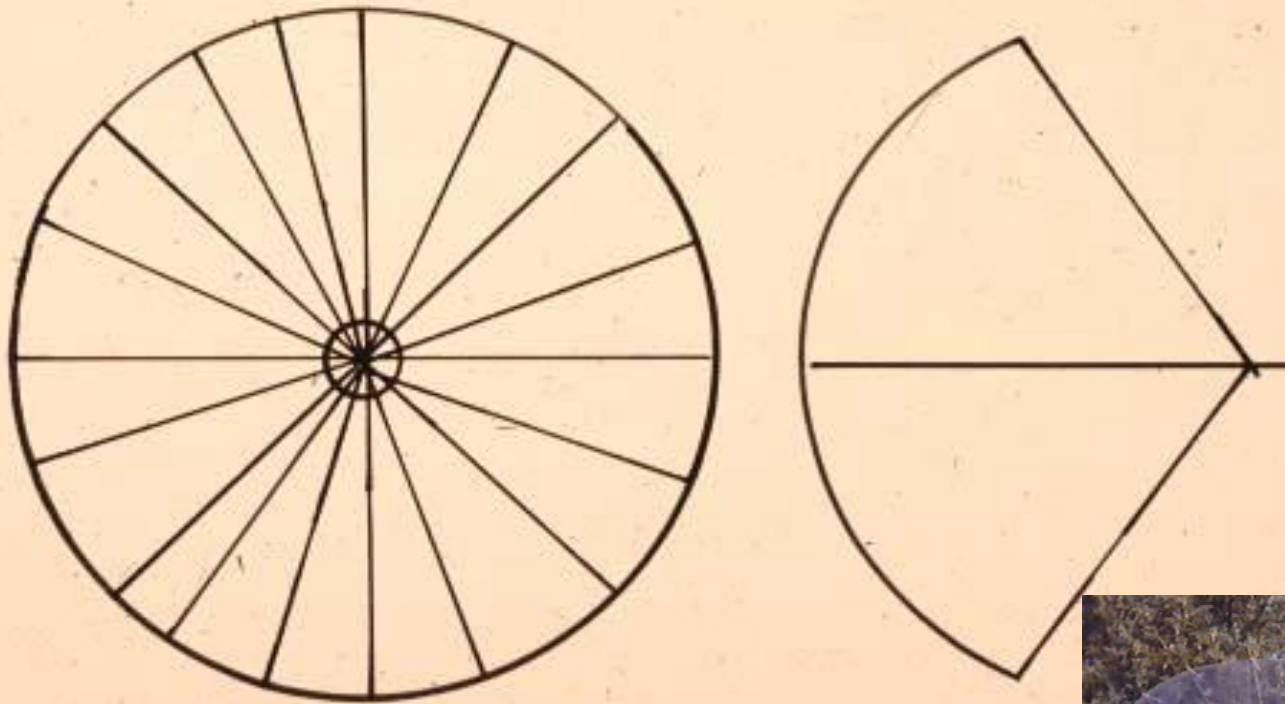


DISH BASICS $X^2 = 4PY$



- 7' DISH WITH $F/D = 0.55$
- DEEPER DISH – SMALLER F/D

REFLECTOR COMPOSED OF A NUMBER
OF BEAMS IN THE FORM OF SPOKES
OF A WHEEL



N2UO

7' STRESS DISH USED ON 23 CM ON VIRGIN ISLANDS

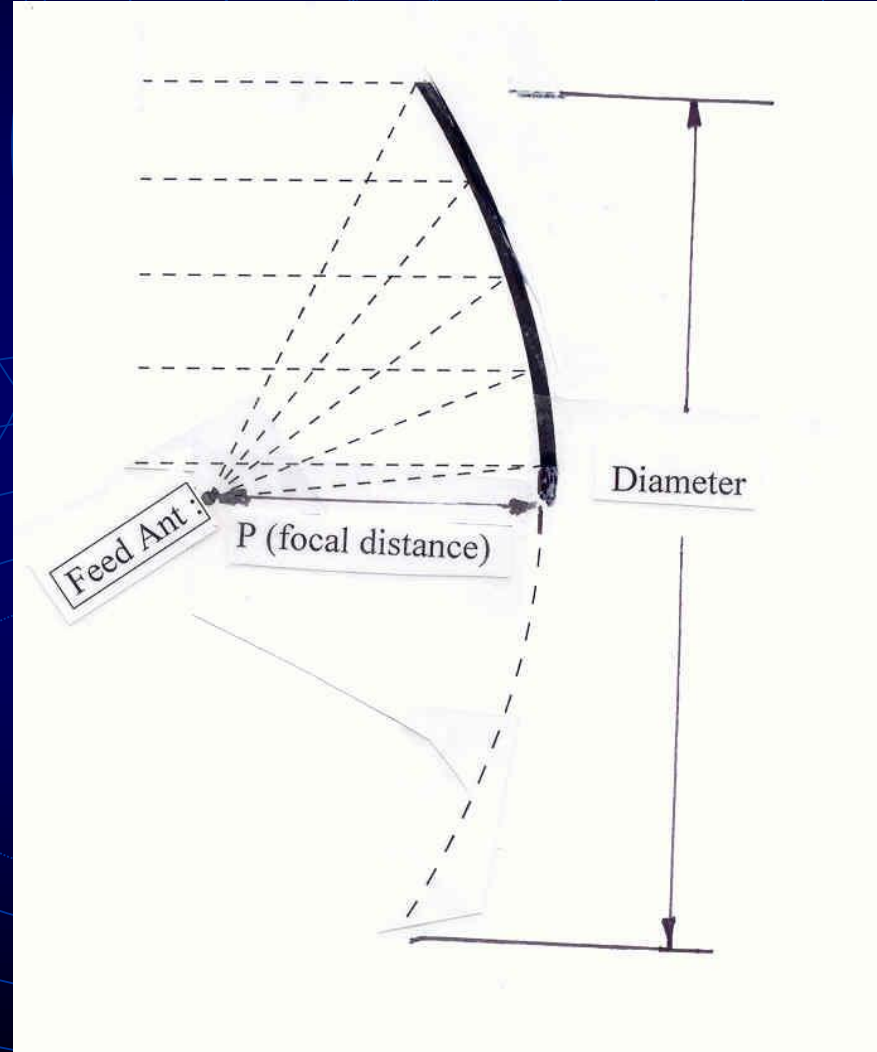


FOR 23 CM CAN USE SMALL DISH

- **SMALL DISH'S EFFICIENCY REDUCED BY APERATURE BLOCKAGE**
- **AN OFFSET DISH SOLVES THIS PROBLEM***
- **ALSO OFFERS **BIG** ADANVATGES IN ASSEMBLY AND MOUNTING**

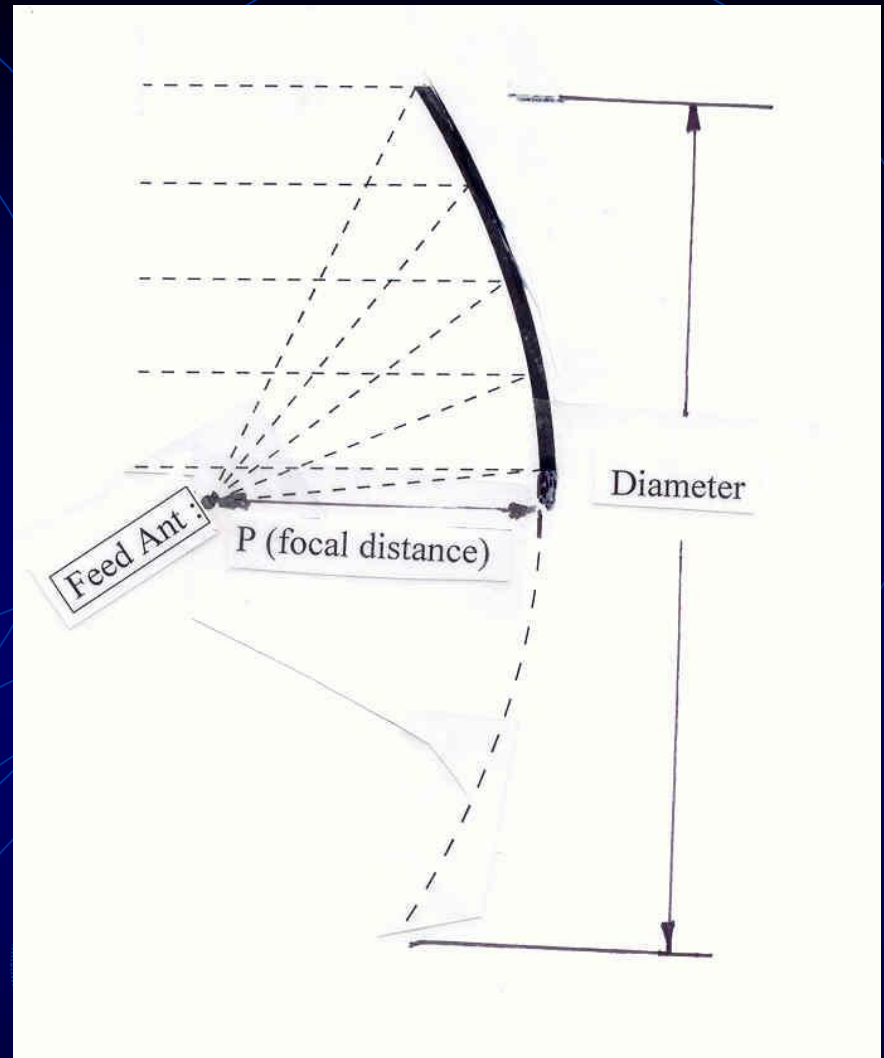
OFFSET DISH USES PART OF SURFACE

- USES $\sim \frac{1}{4}$ DISH SURFACE
- FEED POINT DOES NOT CHANGE
- MOVES FEED HORN OUT OF MAIN BEAM
- FEED POINTS TO SURFACE
- NEEDS DEEPER DISH *EQUIVALENT F/D OR HIGHER GAIN FEED*



- **Surface Reflector**

- | f/d | f/d |
|-------------|-------------|
| 0.90 | 0.46 |
| 0.85 | 0.44 |
| 0.80 | 0.43 |
| 0.75 | 0.41 |
| 0.70 | 0.40 |
| 0.60 | 0.36 |
| 0.55 | 0.34 |
| 0.50 | 0.32 |
| 0.45 | 0.30 |
| 0.40 | 0.28 |



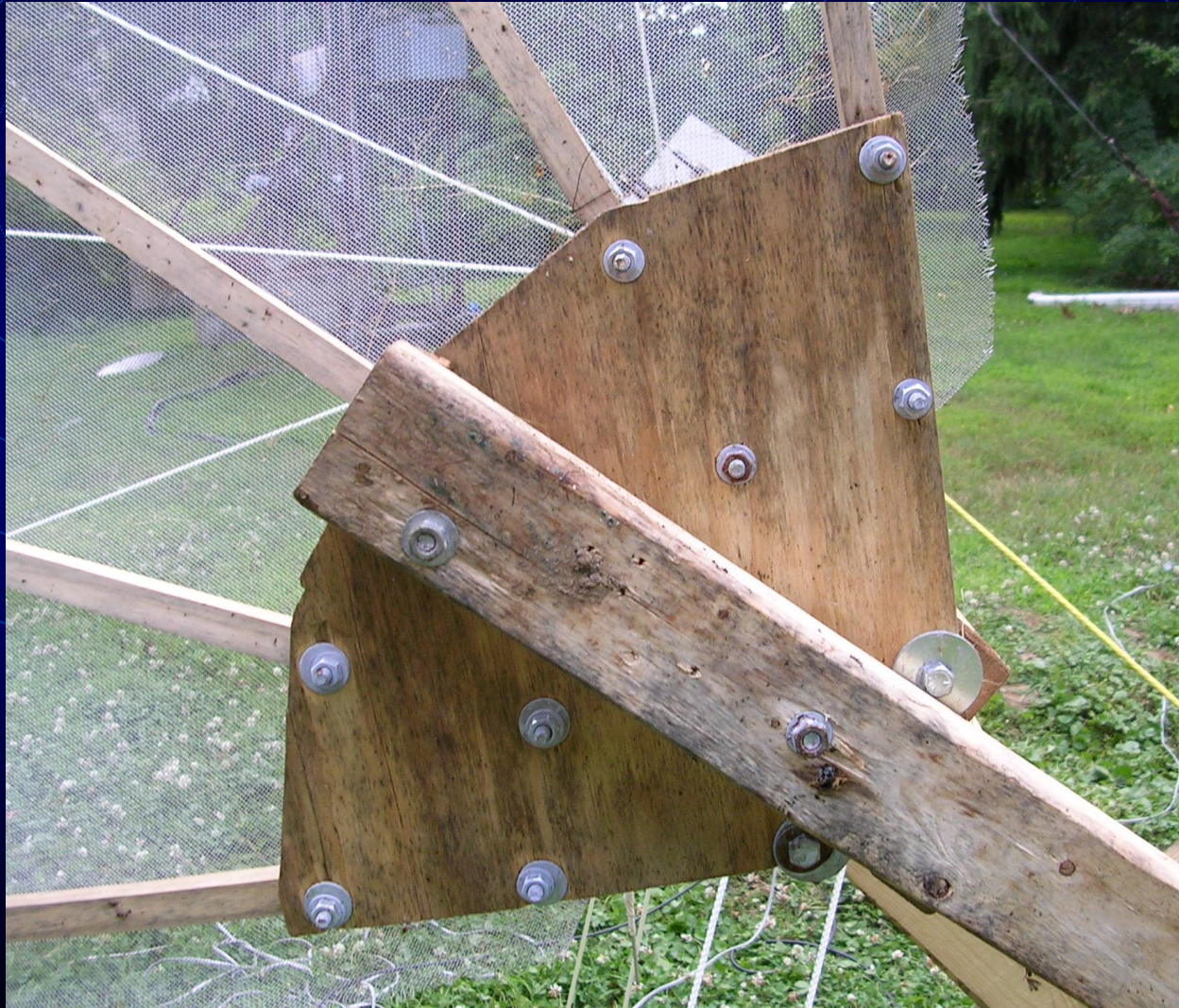
NEED HIGHER GAIN FEED

DISH CONSTRUCTION



- **7.5' OFFSET DISH**
- **5 LENGTHS OF**
 $\frac{1}{2}$ " x $\frac{3}{4}$ " WOOD
MOLDING STOCK
- **$f/d \sim 0.3$**
- **FEED HORN BW**
 $\sim 90^\circ$

SPOKES ATTACHED TO QUARTER ROUND PLYWOOD CENTER



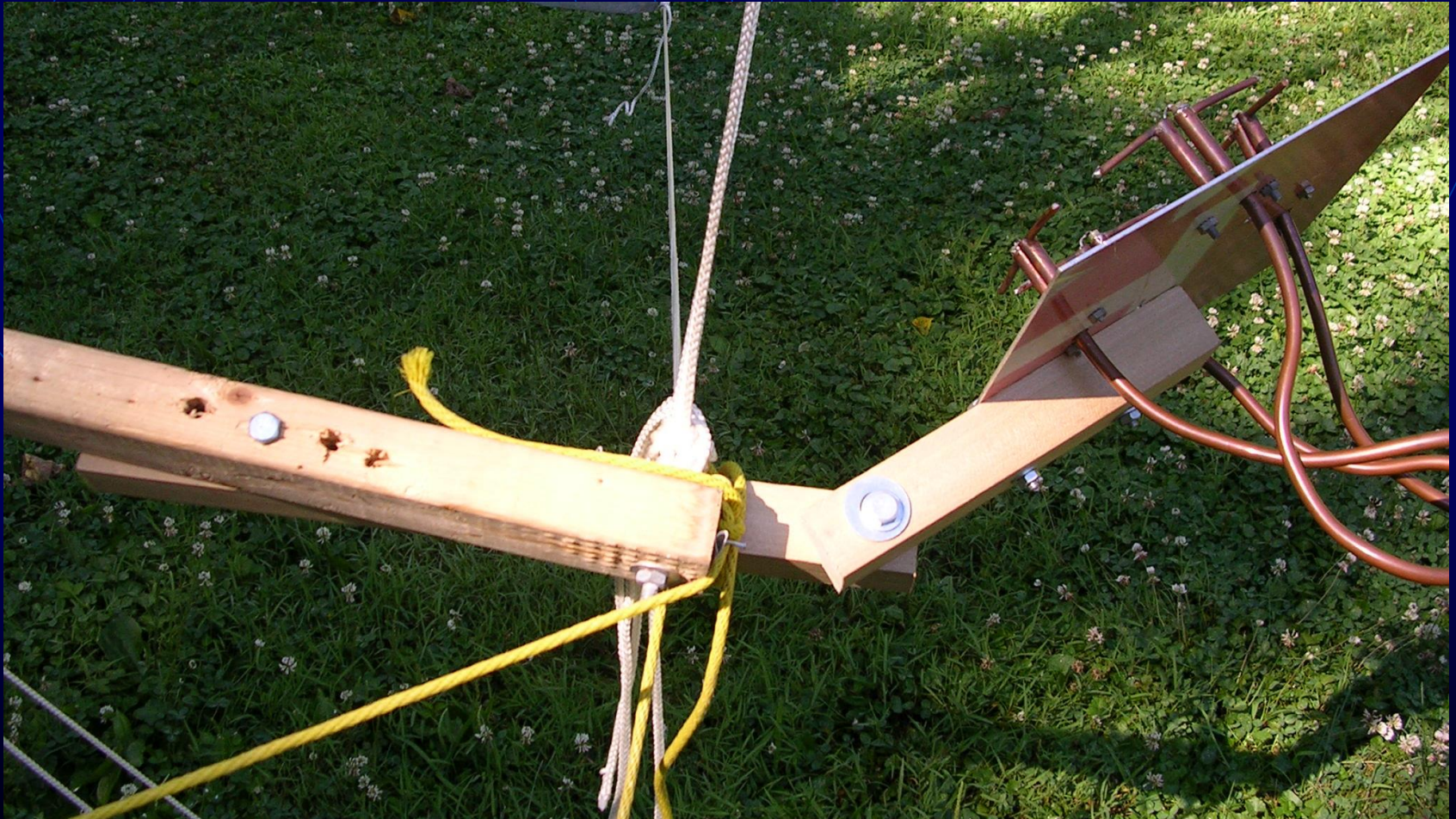
OUTSIDE RIM FORMED FROM 3.5' LENGTH MODELING STRIPS



COVERED BY ALUMINUM SCREENING TIED TO THE STRUTS USING WIRE



FEED MOUNTED USING MULTIPLE SUPPORTS TO ALLOW OPTIMUM POSITIONING

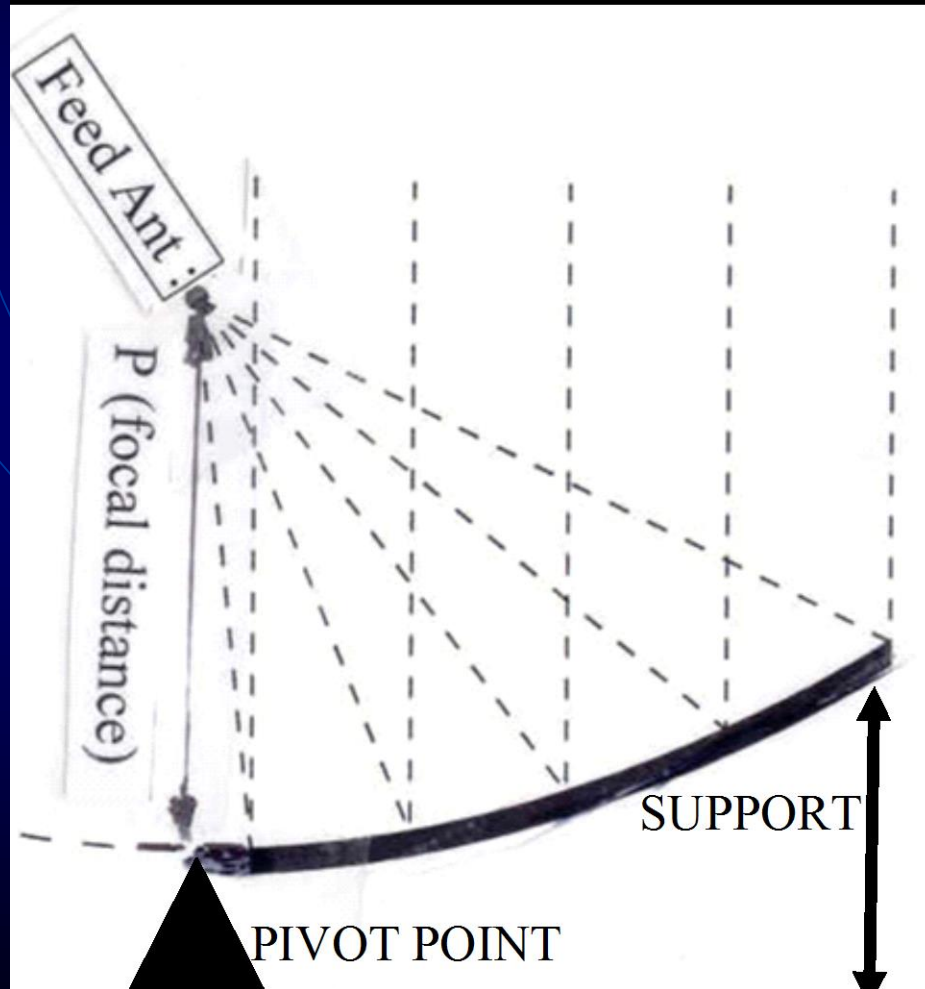


BREAKS INTO A FEW SMALL & LIGHT WEIGHT PIECES

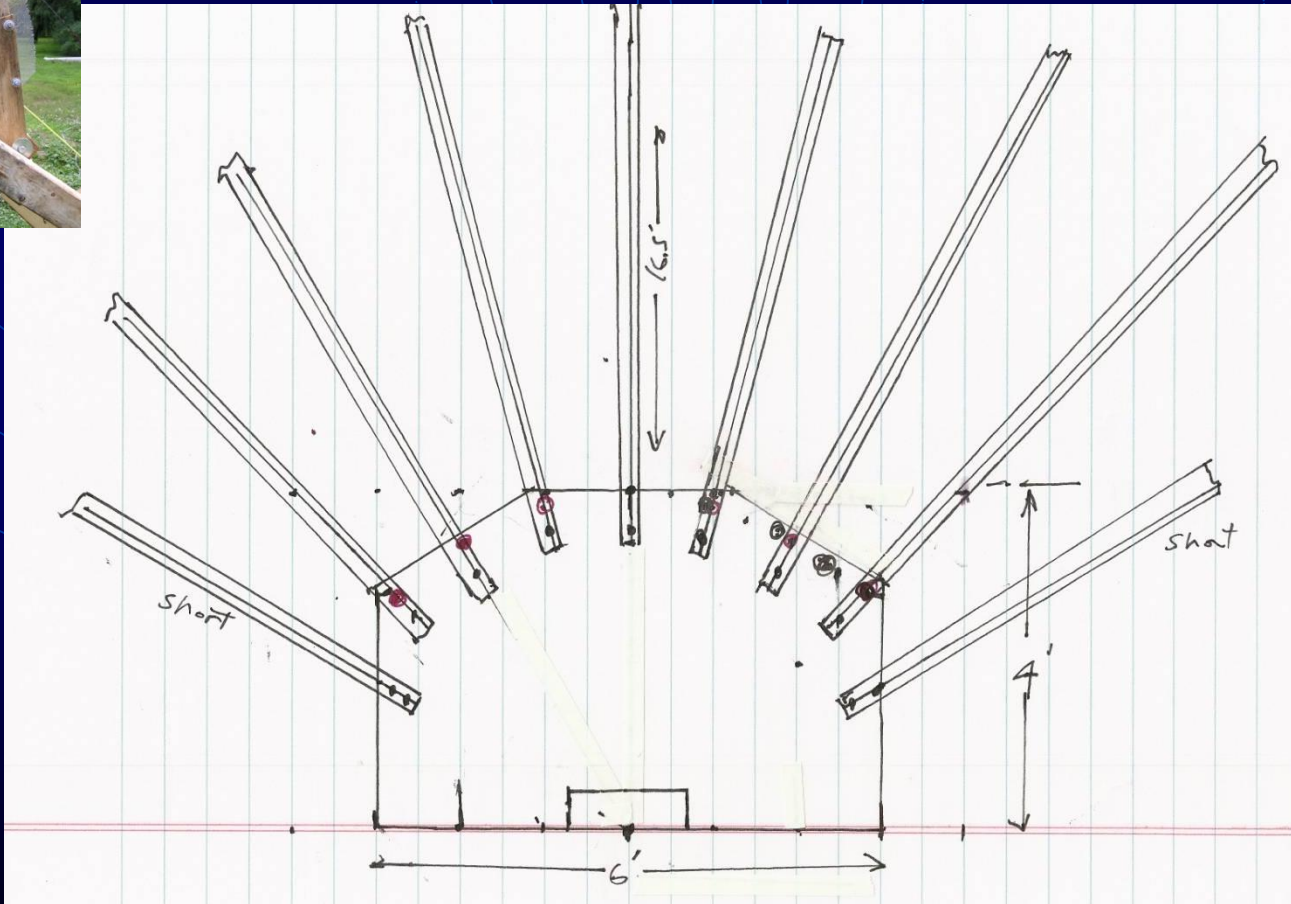


AN OFFSET DISH CAN BE MOUNTED CLOSE TO THE GROUND

IT CAN PLACED
ON THE GROUND
POINTING UP
WHEN NOT IN USE

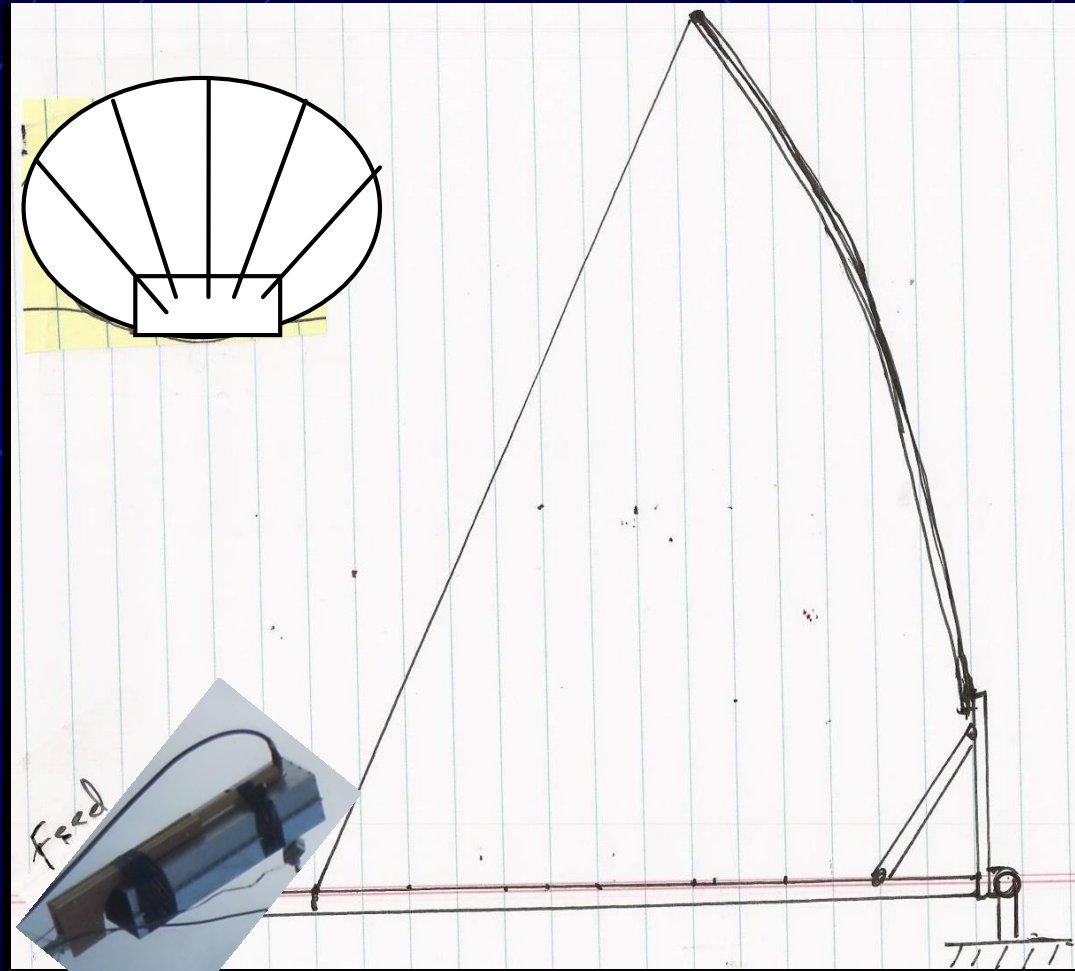


BIG OFF-SET STRESS DISH (20')
7 LONG & 2 OPTIONAL SHORT SPOKES
(16.5'x1"x2")
CENTER HUB 4'X6'



SIDE VIEW – BIGGER OFFSET STRESS DISH

$f/d \sim 0.9$ – CAN USE SMALL YAGI TO FEED



FEED POINT $\sim 9'$ (2"x4")



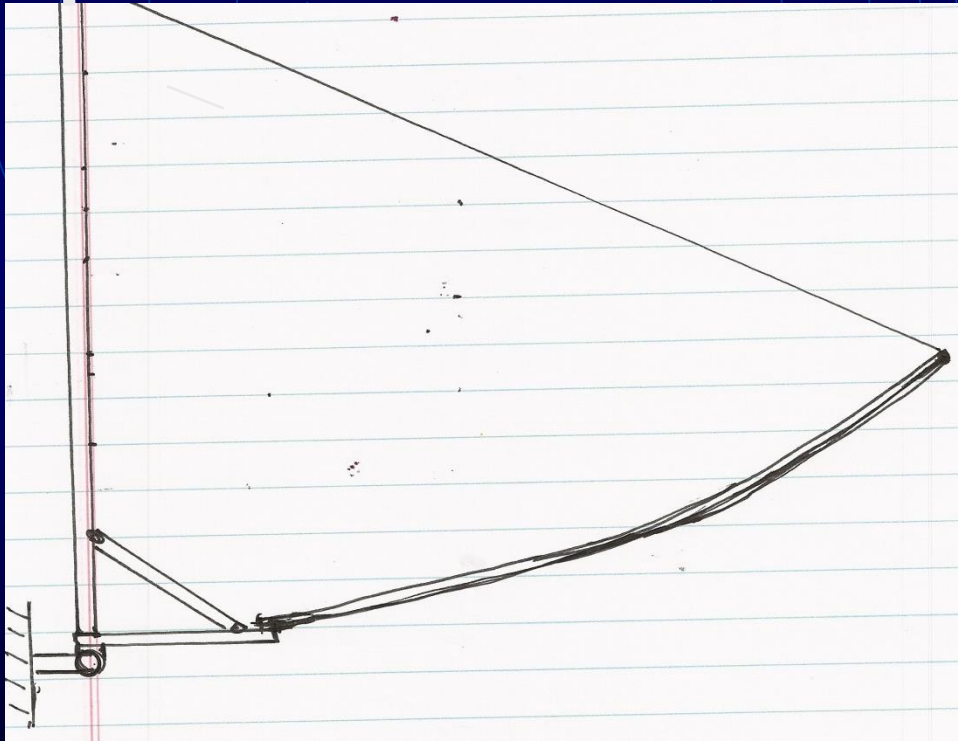
CROSS BRACE $\sim 5.5''$

PORTABLE "LONGEST
PIECE PROBLEM":
PARTIALLY SOLVED BY
EXTENDING CENTER HUB

STARTING BENDING AT A
1" OFFSET, REDUCES
SPOKE LENGTH BY ABOUT
A THIRD.

WHEN NOT IN USE ROTATE SO FLAT ON GROUND

REFLECTOR $f/d \sim 0.45$



PARTS:

1 – 4'x6' (3/4" PLYWOOD)

CENTER PLATE

7 (OR 9) - 16.5"x1"x2" REDWOOD
SPOKES

6 (OR 8) – 5.5' x 3/4"x1/2" CROSS
BRACES

1 – 18'x2"x4" FEED SUPPORT

~400 SQ" MESH OR WIRE COVER

FEED MOUNTING HARDWARE

MOUNT HARDWARE



CONCLUSION

- **INEXPENSIVE AND SIMPLE WAY OF MAKING ANTENNAS FOR POTABLE & HOME EME ON 23 CM (& OTHER BANDS)**
- **23 CM DISH PROVIDED > 8 dB OF SUN NOISE, 3 dB $> 15'$ LOOP YAGI ($+3$ dB FOR CIR POL)**
- **EASY TO ASSEMBLE & SIMPLE MOUNT**
- **CAN MOUNT VERY CLOSE TO THE GROUND & STORE WITH DISH FLAT ON THE GROUND**